REMARKS

By way of this communication applicants have canceled claims 2-5, 7 and 12. The limitation of claim 2 has been incorporated into amended claim 1.

Applicants have also amended claim 6 by requiring that the nitramines be washed with hexane and not a mixture of isopropyl alcohol and water. Support for this can be found in paragraph [0034] of the instant specification.

Applicants acknowledge their election of claims 1-12 in a previous restriction requirement.

First Rejection Under 35 USC § 103(a)

Claims 1-5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (USP 6,080,907) in view of Spencer et al. (USP 5,977,354) in view of Melvin (USP 5,284,995) in further view of Yokoyama et al. (USP 6,284,661).

Regarding claim 1, steps (a) and (b) - Examiner's Position

The examiner believes that Miller teaches the use of high pressure jets of water or ammonia to open a munitions casing to expose the components and that abrasives can be present in the high pressure stream(abstract).

Applicants' Position

Miller teaches away from the use of water as a cutting fluid. For example, column 7, lines 54 – 58 of Miller reads:

> "This phase of the process can be performed not only at a faster, more efficient rate, relative to water as a cutting fluid, but also with greater safety because of reduced risk of explosion occurring when using anhydrous ammonia as the solvating fluid."

The instantly claimed invention is limited to the use of water since this is the preferred high pressure fluid for cutting the munition open (step a) and washing the nitramine/TNT mixture out of the munition (step b). Water is used and not any other fluid type since the instantly claimed

invention recovers the energetic material for reuse without destroying it as ammonia would. Melvin also indicates the use of only ammonia. Thus, both Miller and Melvin's use of ammonia does not allow for the recovery of energetic since it would be destroyed during the process.

Regarding claim 1 step (c) - Examiner's Position

The examiner contends that although, Miller does not teach cooling below 80° C, Miller also does not teach that the stream has been heated above 80° C, and one skilled in the art would expect the stream to be less than 80° C given STP, absent any evidence to the contrary.

Applicants' Position

It is applicants' position that an energy balance on a high pressure fluid jet shows that the stagnation temperature of the jet can exceed 80°C. The stagnation temperature depends on the velocity of the stream, the inlet temperature, and the heat capacity of the fluid. For room temperature feed water to a high pressure pump compressing water to 50,000 psi, as commonly used in high pressure water jets, the velocity of the jet issuing from the nozzle has a velocity on the order of 750 m/s. This translates into a stagnation temperature of approximately 92°C. This is clearly stated in paragraph [0022] of the instant application without using the term stagnation temperature. Thus, a temperature will be greater than 80°C if high pressures are used. Also, when high pressure is used for cutting munitions steam typically forms, which is evidence of temperatures at 100°C.

Regarding claim 1 steps (d) and (e) – Examiner's Position

It is the examiner's position that although Miller does not explicitly teach the use of a settling tank, Miller does teach that when water is used an emulsion is formed, and the skilled artisan would appreciate that an emulsion left to stand (settle) will revert to a biphasic solution, and the skilled artisan would appreciate that components less dense (i.e. binders) than the cutting fluid, will float on top of the cutting fluid, and that components that are more dense (i.e. explosive ingredients) than the cutting fluid will sink the bottom. At this point the skilled artisan would appreciate that the components floating on top of the cutting fluid can be

easily decanted from the mixture and further processed to remove residual cutting fluid from the solid material (i.e. binders). The examiner believes Yokoyama teaches that debris from cutting needs to be removed from the cutting fluid before the cutting fluid can be recycled and used again to prevent deterioration of the work environment and damage to cutting instruments (column 1, lines 33-40).

Applicants' Position

Miller states that water emulsions are stable in column 2 lines 4-8 so even by his disclosure separation cannot be achieved by letting the emulsion sit and phase separate. There are no other cited references that address the handling of emulsions. The instantly claimed invention, instead, does not produce an emulsion. The cooling of step (c) of in the instant invention avoids the formation of a stable emulsion. The word "emulsion" is not used in the instant patent application because an emulsion was not observed by the inventors during the practice of the instantly claimed invention. It is the cooling step c) that allows for gravity separation.

Yokoyama recycles cutting fluid after removing debris and then reuses it to cut again. The instant application filters process fluid and recycling process fluid that happened to start out as cutting fluid. This is done to recover explosive by increasing yield. The bottom line is that the cutting fluid of the instant invention only goes through a cutting process once. That is, the instant invention does not require recycled water to a point in the process AFTER the cutting. In other words, the instant invention does not recycle water to the water-jet pump.

Regarding claim 1 step (f) – Examiner's Position

It is the examiner's position that Miller teaches the recycling of the cutting fluid (column 15, lines 16-37), and even though this specific teaching is directed towards ammonia the skilled artisan would appreciate that this also could be done when the cutting fluid is water, since these cutting fluids will present a environmental disposal problem if not recycled.

Applicants' Position

It is applicants' position that this recycle step is more important from a cooling aspect. In other words, previously cooled fluid can be used to assist in cooling the warmer material in step (c) of instant claim 1. The examiner makes his argument based on environmental grounds. The recycle of the instantly claimed invention is for an energy efficiency standpoint i.e. heat integration. Miller does mention recycling ammonia. However, it is clear that gaseous ammonia is recovered and would have to be recompressed (liquefied) to be reused. Miller does mention filtering the feed ammonia, which is a liquid. This would have nothing to do with filtering ammonia that has already been used in the "ammonia-jet." It is important to note that Miller does not mention the recovery of ammonia that has been dissolved in the reaction mixture containing the explosive. Ammonia is consumed in the reaction mixture to also destroy energetic. Hence, this ammonia is not recoverable. The only ammonia Miller can recover is that which vaporizes and is collected. Vaporized ammonia is most likely free of abrasive since it is extremely unlikely the vaporized ammonia will carry the dense abrasive with it.

Regarding claim 1 step (g) and (h) – Examiner's Position

It is the examiner's position that the skilled artisan would appreciate that the solids at the bottom of the settling tank (composed of energetic material and abrasive particles) can be removed as a slurry, and that Miller teaches removing the abrasive particles from the mix through either filtration or magnetic means (column 19, lines 8-14).

Applicants' Position

Applicants' claims are now limited to gravity settling as the means for separating abrasive material. Miller does not mention settling (density differences and settling velocity differences) as the means of separation. Miller only teaches using magnetic abrasive with a magnetic filter and filtration.

Regarding claim 1 steps (i) – Examiner's Position

It is the examiner's position that although, Miller does not explicitly disclose the stripping of water with a solvent(methanol), Miller is directed towards recovery of the energetic materials, however, because Spencer teaches that TNT can be removed from secondary

explosives by washing the TNT/nitramine mixture with a solvent for TNT that is a non-solvent for the nitramine, and although, Spencer does not teach the use of methanol, Spencer teaches that non-solvents for the nitramine can be easily determined by those skilled in the art (column 2, lines 20-27), which would serve to displace the remaining water, making a slurry of nitramines in TNT solution, and Melvin teaches the "Final separation of and recovery of the target material can be accomplished. using a wide variety of chemical wash, extraction, and crystallization methods." and that "Methanol for example is an excellent solvent. The HMX and RDX nitramines are insoluble in methanol." (column 7, lines 24-29 and 50-55), further demonstrating the obviousness of substituting methanol for other solvents and modifying certain steps absent any showing of criticality.

Applicants' Position

Spencer is directed to washing HMX and RDX (nitramine) to remove residual TNT that is coating the energetic crystals. Spencer conducts a prior separation of TNT from the nitramine by using a sieve (column 2 lines 13-18). As a result of this sieving, Spencer removes the majority of the TNT from the nitramine. He then uses a solvent to dissolve the residual TNT on the nitramine. The instantly claimed process is different than Spencer in that the instantly claimed invention first displaces water with methanol and then dissolves substantially all of the TNT with methanol, thus achieving a large concentration of TNT in methanol. Spencer uses acetone and toluene to dissolve the residual TNT. This results in a solution having a very low concentration of TNT. Also, Spencer does no solvent displacement as required by the instantly claimed invention. Further, at low TNT concentration the solvents acetone and toluene a suitable for use in the Spencer process. On the contrary, acetone and toluene are not suitable for use in the instantly claimed process where the object is to dissolve substantially ALL of the TNT. Further, subsequent processing of acetone or toluene with large a concentration of TNT would result in a **non-ideal** solution that would be difficult to process to recover the TNT. The solutions of Spencer have low TNT concentrations and thus behave ideal yielding them easy to process. In the instantly claimed process the use of methanol dissolves substantially all of the TNT (high concentration of TNT in methanol).

The Melvin process recovers ammonia-soluble materials by evaporating the ammonia (column 7 lines 22-24). The instantly claimed separation is done by adding methanol to both displace water and to also dissolve the TNT and thus the instant separation is done by dissolution of TNT with methanol - not by evaporating a solvent (water) to recover solid energetic. Also, no purification of materials is done in the instantly claimed invention. Further, the lines cited by the examiner are directed to the purification of the recovered solids. This step cannot be compared to the instantly claimed process that is not purifying anything. Lastly, Melvin mentions the use of methanol for only ammonium perchlorate, plasticizers, and stabilizers. All of these compounds have structures that are not similar to TNT. Lastly, Melvin does not disclose his method of recovering the material dissolved in the methanol.

Regarding claim 1, step j) – Examiner's Position

The examiner comments that the continued washing steps of Spencer provide for the separation of TNT from the nitramine.

Applicants' Position

As previously mentioned, the instantly claimed process dissolves substantially all of the TNT and does not was the nitramine that contains only a small amount of TNT on it. The high TNT concentrated solution using methanol behaves as an ideal solution whereas Spencer has low concentration solutions that act ideal. Again, this step is merely one in a series of steps that taken as a whole define a patentable invention over the cited art.

Regarding claim 1 steps (k) and (l) – Examiner's Position

It is the examiner's position that although both Miller and Spencer fail to teach the solution of TNT is flash vaporized, or that the solvent is recovered, this would be obvious because one skilled in the art would appreciate that TNT has value and would isolate this component from the solvent to be reused or sold, and stripping the solvent would be the easiest way to separate the TNT from the solvent. With respect to recycling the solvent as stated above, it would be obvious because the disposal of the solvent would present environmental problems and recycling the solvents saves money additionally by requiring the

purchase of less solvent for the process.

Applicants' Position

It is applicants' position that Miller does flash ammonia and in doing so destroys the energetic material. Thus, there is no valued material to collect. Again, Spencer is dealing with dilute ideal solutions that can be handled easily. TNT cannot be easily recovered from concentrated acetone solutions since they are highly NON-IDEAL! Our choice of methanol avoids non-ideal solutions and can thus be readily processed to recover TNT. Lastly, the recycling of methanol is achievable because we are recovering TNT by flashing and recovering the methanol. Instant claim 1 step l) does not claim recycling methanol. Applicants have canceled claim 7 that required the methanol to be condensed and recycled.

Regarding claim 1 steps (m) and (n) – Examiner's Position

It is the examiner's position that although the references are silent as to stripping remaining solvent from the TNT using steam, or drying the TNT to a predetermined level, such limitations are considered obvious because the solvent needs to be removed from the TNT product before reuse of that product and contacting with steam is one method to remove residual solvent. The examiner continues by saying that it is well known that TNT in the wet state is less hazardous, and one skilled in the art could determine the level of dryness desired to add a layer of safety to the recovered TNT product.

Applicants' Position

Applicants are not contending that these two steps are novel in and of themselves. They are part of a multi-step process which combined steps are novel and patentable over the cited art.

Regarding claim 2 – Examiner's Position

It is the examiner's position that the references teach filtration for the removal of the TNT solution from the nitramine and the examiner points to column 2, lines 13-28 of Spencer)

Applicants' Position

Applicants have canceled claim 2.

Regarding claims 3-5 – Examiner's Position

It is the examiner's position that Miller teaches using garnet and magnetic separation of the abrasive particles (column 18, line 30 to column 19, line 14).

Applicants' Position

Applicants have deleted claims 3 to 5.

Regarding claim 7 – Examiner's Position

It is applicants' position that although the references are silent with respect to condensing and recycling, the methanol solvent, this is obvious for the reasons stated above because disposing of process solvents adds cost in buying more solvents and disposing of solvents defeats the purpose of the inventions of the references and the instant application as they are directed towards recycling hazardous materials for environmental purposes and discharge of process solvents would defeat this purpose, plus there is the added cost with disposal.

Applicants' Position

Applicants have deleted claim 7.

Regarding claim 8 – Examiner's Position

It is the examiner's position that although, the reference are silent in this respect, this is considered obvious because in a continuous process settling process where some components are skimmed off the top and other are settling, if the feed rate is faster than the settling rate the more dense components will not settle and will be removed with the less dense materials.

Applicants' Position

The examiner states that "if the feed rate is faster than the settling rate the more dense components will not settle." Applicants respectfully disagree with the examiner in that the feed rate and settling rate are highly independent. The purpose for continuously feeding water at the bottom of the settling vessel is to remove the components that have settling rates less than the upward velocity of the water. The materials removed from the top are determined by the settling rate relative the liquid velocity upward i.e. only those particles with settling rates less than the upward velocity of the liquid will be removed.

Regarding claim 9 – Examiner's Position

It is the examiner's position that the separation process as taught by Spencer teaches a process where TNT is separated from secondary explosives, where the sealer material is removed from the feed matrix prior to further separation (see entire document).

Applicants' Position

Applicants respectfully disagree with the examiner. It is applicants' position that Spencer does not suggest or teach munition liner materials. In fact, in his process of steam melting out the TNT, the liner is most likely left in the munition and never removed. The instantly claimed invention uses high pressure wash-out which removes the liner which then needs to be separated from the other washed-out materials.

Therefore, in view of the above comments with respect to each of the steps of claim 1 it is applicants' position that claim 1, when taken as a series of required steps, is unobvious and patentable over the cited art. Thus, applicants request that the examiner reconsider and withdraw these rejections with respect to claim 1.

Second Rejection Under 35 USC § 103(a)

Claims 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (USP 6,080,907) in view of Spencer et al. (USP 5,977,354) in further view of

Melvin (USP 5,284,995) as applied to claims 1-5.and 7-9 above, and further in view of Somoza et al. (USP 5,279,492).

Examiner's Position

It is the examiner's position that because Somoza teaches a process for the desensitization of explosives and states that Class I RDX is prepared as a wet slurry comprising RDX, isopropyl alcohol, and water for shipping and storing, for safety reasons (column 1, lines 55-60), it would have been prima facie obvious to someone of ordinary skill in the art at the time of invention to modify the primary references, by making a slurry of RDX, isopropyl alcohol, and water, after separation from the other components before shipping or storing the material for safety reasons, as suggested by Somoza.

Applicants' Position

Claim 6 has been amended so that the nitramines are washed with hexane and not a mixture of isopropyl alcohol and water. Spencer does not teach washing with hexane.

Claim 12 has been canceled.

In view of the above, applicants contend that these claims are patentable over the cited art. Consequently, applicants request that the examiner reconsider and withdraw these rejections.

Third Rejection Under 35 USC § 103(a)

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable. over Miller (USP 6,080,907) in view of Spencer et al. (USP 5,977,354) in further view of Melvin (USP 5,284,995) as applied to claims 1-5 and 7-9 above, and further in view of Wulfman (USP 5,44.5,690).

Examiner's Position

It is the examiner's position that the primary references are silent with respect to the nitramine containing a desensitizing agent such as a natural or synthetic wax, however,

because Wulfman teaches that many times for safety reasons highly brisant materials (i.e. RDX, HMX, PETN, etc.) are " phlegmatized" (i.e. coated with a wax), one skilled in the art would expect that sometimes the energetic materials removed from military ordinance will contain a coating of wax and Miller teaches that along with the cutting fluid can be used "hydrocarbons such as pentane, decane'and so forth." (column 24, lines 14-15), the skilled artisan would appreciate that hexane could be substituted for pentane or decane with predictable results and having the effect of removing through dissolution any wax coating on the secondary explosives present, and since it is desired to achieve pure products after the separation processes have been performed.

Applicants' Position

Miller does not suggest the steps of claims 10 and 11. The examiner's citation of Miller focuses on the use of other fluids instead of ammonia to washout munitions and nothing to do with cleaning up recovered nitramine. Also, Miller does not recover nitramine at all. Further, Spencer does not disclose desensitizing agents on nitramines. Melvin also never addresses desensitizing agents. Wulfman only discloses the purpose of a desensitizing agent but does not disclose how to put it on a nitramine or how to take it off.

In view of the above, applicants contend that these claims are patentable over the cited art. Consequently, applicants request that the examiner reconsider and withdraw these rejections.

Double Patent Rejection

Claims 1-12 are rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-23 of U.S. Patent No. 6,777,586 in view of Lamaoureux (USP 6,156,194) for the reasons set forth in the office action.

Applicants submit with this communication a Terminal Disclaimer do that the enforceability of any patent to issue from this instant application will expire on the same expiration date of the 586 patent, which is jointly owned by Gradient Technology.

Therefore, in view of the submission of the Terminal Disclaimer applicants request that the

Examiner reconsider and withdraw this rejection.

In view of the above, it is applicants' position that the claims, as now amended, define a patentable invention over the cited art. Therefore, applicants request that the Examiner reconsider and pass this application to allowance.

Respectfully submitted,

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